US Potato Board

USA Potatoes

US Chip-stock Potatoes

UNITED STATES Potato BOARD

Letter from the President

This brochure is provided to you by The United States Potato Board (USPB) representing 6,000 potato growers in the United States to help you better understand US chipping potatoes.

The mission of our organization is to increase the demand for potatoes and potato products through an integrated promotion program, thereby providing US producers with expanding markets for their production. While we do not directly sell US potatoes, we facilitate sales by giving buyers access to the most up-to-date information for making informed purchases.

The United States Potato industry is thriving, both in the production and export of its crop. Total US potato production in 2002 was 20.8 million metric tons with 11% being utilized for potato chip production.

The large size and scope of our industry, coupled with our country's geographic diversity and technology, means US chip-stock varieties are available year-round.

This brochure contains variety characteristics for 13 US chip-stock varieties; information on US growing, handling and storage practices; shipping conditions; contracting information; a US harvest season map and sources for other information important to purchasing quality chip-stock for your operation.

We welcome the chance to show you the many advantages of US chip-stock and to work with you on determining ways in which US chip-stock can improve your business.

Sincerely,

Timothy L. O'Connor
President and Chief Executive Officer

Introduction

Major chipping varieties grown in the United States include: Alturas, Andover, Atlantic, Chipeta, Dakota Pearl, Ivory Crisp, Kennebec, LaChipper, NorValley, Norwis, Pike, Reba and Snowden. Each variety is highlighted in the following section showing its origin, description and characteristics.

This wide variety of chipping potatoes grown in the US allows production in varying conditions throughout the country. It also means that the US has both storage and fresh dug potatoes available for export year round. These different varieties have different storage, shipping and chipping characteristics, so it is important to analyze the information provided to ensure you get the very best potato for your needs. Finally, it is very important to remember that the only way to ensure you receive the very best potatoes for your operation is to contract with US growers and shippers before planting for delivery when you need them.

Yields range from medium to high

Medium (non irrigated):	175-200 cwt per acre
Medium (irrigated):	350-375 cwt per acre
High (non irrigated):	Above 200 cwt per acre
High (irrigated):	Above 375 cwt per acre

Specific gravity ranges from medium to high

Medium:	1.070 - 1.079
High:	1.080 - 1.089
Very High:	Above 1.089

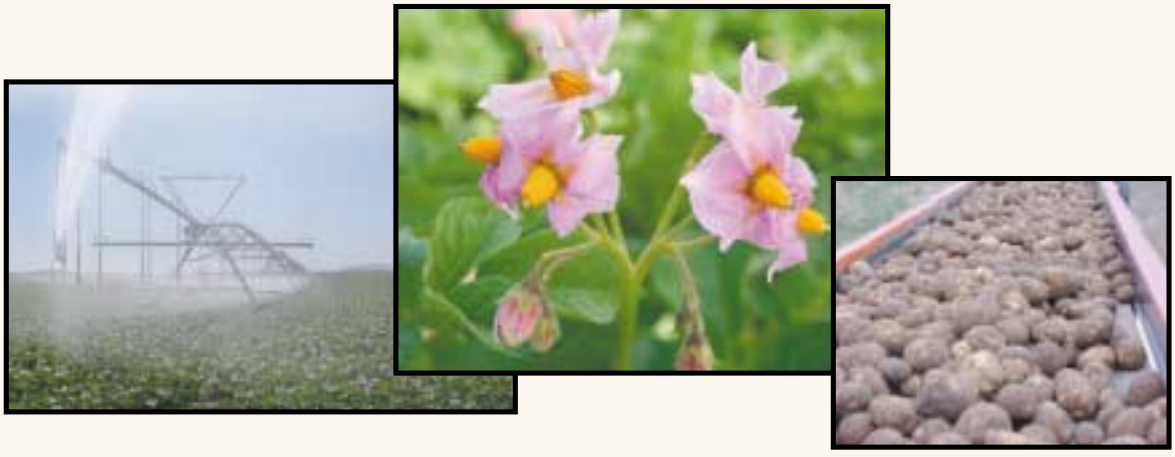
Maturity ranges from early to late season

Early:	90 days from emergence of the potato to harvest
Mid:	100 - 105 days from emergence of the potato to harvest
Late:	120 days from emergence of the potato to harvest

Storability ranges from short dormancy to long dormancy

Short:	75 - 90 days
Medium:	90 - 115 days
Long:	Above 115 days

Note: Variety availability may vary from year to year



ALTURAS

ORIGIN

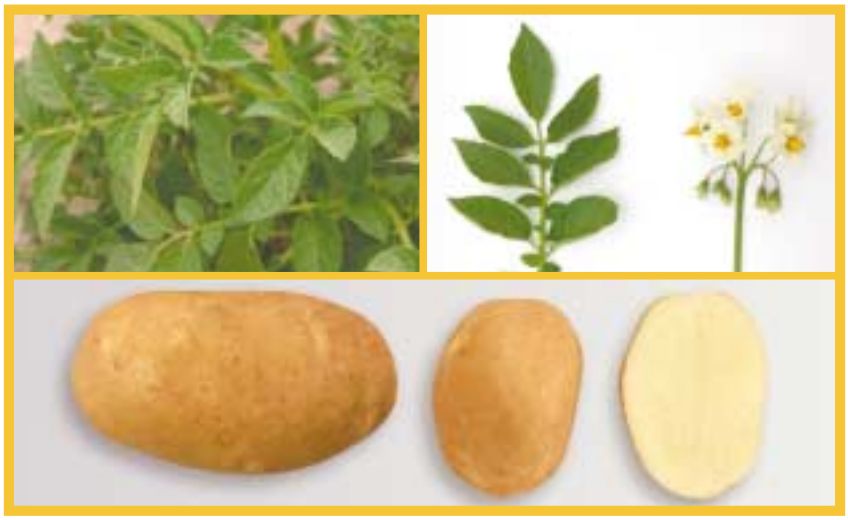
Parentage	A77182-1 x A75188-3
Breeder	University of Idaho
Released	1982
Status	Protected

DESCRIPTION

Tuber shape	Oblong to long
Eyes	Medium, predominantly apical
Skin	Tan
Flesh	White
Plant	Medium, semi-erect
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	High
Maturity	Late
Storability	Short dormancy
Availability	CO, ID, MT, OR, WA, WI



STRENGTHS AND WEAKNESSES

Alturas is a late maturing, very high yielding variety with high dry matter content and oblong, lightly russeted tubers. It was selected for dehydration purposes, but can also be useful for chip processing. This variety has high specific gravity and excellent fry color from storage. Positive attributes include a low percentage of oversized tubers. While its tubers generally exhibit few external and internal defects, they tend to be short and they do occasionally develop growth cracks. Alturas is scab tolerant.

ANDOVER

ORIGIN

Parentage	Allegany x Atlantic
Breeder	Cornell University
Released	1995
Status	Not Protected

DESCRIPTION

Tuber shape	Short oval
Eyes	Shallow
Skin	White, textured
Flesh	White
Plant	Erect, medium
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	Medium
Maturity	Early to midseason
Storability	Medium dormancy
Availability	ME, NY, WI

STRENGTHS AND WEAKNESSES

Andover is an early season table-stock and chipping variety. This variety has medium dry matter content, good storability quality and is excellent for chipping. Tubers are spherical with slightly textured skin. It has good cooking qualities and medium specific gravity. Andover has an excellent chip color from 45°F (7.2°C) storage. Andover is relatively free from internal defects. It is resistant to golden nematode and powdery scab, moderately resistant to common scab and susceptible to early dying and early blight.

ATLANTIC

ORIGIN

Parentage	Wauseon x B5141-6
Breeder	USDA Beltsville
Released	1978
Status	Not protected

DESCRIPTION

Tuber shape	Short oval
Eyes	Shallow
Skin	Light to heavy scaly net, buff
Flesh	White
Plant	Medium large size, upright
Flowers	Purple

CHARACTERISTICS

Yield	High
Specific gravity	High
Maturity	Midseason
Storability	Medium dormancy
Availability	CA, CO, ID, ME, MI, MN, ND, NE, NY, OR, WA, WI

STRENGTHS AND WEAKNESSES

Atlantic is a midseason cultivar used for chipping and processing markets. With high yield potential, high specific gravity and uniform tuber size and shape, Atlantic is the standard variety for chipping from the field or from very short-term storage. It is noted for its light chipping color and its consistently high specific gravity equal to 1.090. The cultivar is tolerant to scab and verticillium wilt; resistant to pinkeye; and highly resistant to Race A of golden nematode, virus X and tuber net necrosis. Tubers are susceptible to hollow heart, blackspot and shatter bruise. Hollow heart in larger diameter tubers (>.83mm) can be serious in some growing areas.

CHIPETA

ORIGIN

Parentage	WNC612-13 x Wischip
Breeder	Colorado State University
Released	1993
Status	Not protected

DESCRIPTION

Tuber shape	Short oval
Eyes	Shallow, even distribution
Skin	White to light tan
Flesh	White
Plant	Large, erect
Flowers	Red-purple

CHARACTERISTICS

Yield	High
Specific gravity	High
Maturity	Mid to late season
Storability	Medium dormancy
Availability	CA, CO, ID

STRENGTHS AND WEAKNESSES

Chipeta is a medium to late maturing variety used for chipping and processing markets. Tubers have moderately high specific gravity and accumulate less sugars in storage than most standard chipping varieties. It is noted for its excellent chip color after long term storage. Chipeta is resistant to most internal and external defects including second growth, growth cracks, hollow heart, heat necrosis, blackspot bruise, leafroll-induced net necrosis, verticillium wilt and both foliar and tuber phases of early blight. Chipeta is susceptible to fusarium dry rot.

DAKOTA PEARL

ORIGIN

Parentage	ND1118 x ND944-6
Breeder	North Dakota State University
Released	1999
Status	PVP application pending, North Dakota State University

DESCRIPTION

Tuber shape	Round
Eyes	Shallow
Skin	White
Flesh	White
Plant	Large, semi-erect
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	Medium to high
Maturity	Midseason
Storability	Long dormancy
Availability	ME, MN, NE, ND, OR, WA, WI

STRENGTHS AND WEAKNESSES

Dakota Pearl is a mid-season cultivar that produces white uniformly round tubers. This variety has medium to high specific gravity generally in the low-mid 80s and is capable of delivering exceptional chip quality after long-term storage of tubers at 42°F (60°C). Dakota Pearl has a low percentage of external defects and is resistant to cold sweetening.

IVORY CRISP

ORIGIN

Parentage	ND292-1 x TND22-2
Breeder	Agricultural Experiment Stations of ID, OR, WA, ND, USDA
Released	2001
Status	Protected

DESCRIPTION

Tuber shape	Round
Eyes	Medium, predominantly apical
Skin	White
Flesh	White
Plant	Closed-medium, spreading vine
Flowers	White

CHARACTERISTICS

Yield	Medium
Specific gravity	High
Maturity	Midseason
Storability	Medium dormancy
Availability	ID, ND, WI

STRENGTHS AND WEAKNESSES

Ivory Crisp is a mid-season variety with specific gravity ranging from 1.090 to 1.095. Tubers are round, white, and medium in size. Ivory Crisp is a dependable chipper from long-term storage. This cultivar chips directly from cold temperatures without reconditioning. A desirable feature of Ivory Crisp is that it has very consistent chipping quality from year to year. This variety has very few internal defects. Ivory Crisp is susceptible to PVX and is extremely susceptible to shatter bruise.

KENNEBEC

ORIGIN

Parentage	B127 x USDA 95-56
Breeder	USDA
Released	1948
Status	Not protected

DESCRIPTION

Tuber shape	Short oval
Eyes	Shallow
Skin	Smooth, buff
Flesh	White
Plant	Large
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	Medium to high
Maturity	Midseason
Storability	Medium dormancy
Availability	AK, ME, MN, MT, NY, WA, WI

STRENGTHS AND WEAKNESSES

Kennebec is good to excellent for boiling, baking, chipping and frying. The consistently high yield and good culinary qualities are the primary strengths from this variety. Specific gravity is medium to high and cooking quality is good. Kennebec stores best at 50°F (10°C) or more for good chip color. This variety has moderate field resistance to late blight and is resistant to net necrosis, blackleg, PVY and PVA. It is susceptible to verticillium wilt, scab, growth cracks, hollow heart and pinkeye.

LA CHIPPER

ORIGIN

Parentage	Green Mountain x Cayuga
Breeder	Louisiana Agricultural Experimental Station
Released	1962
Status	Not protected

DESCRIPTION

Tuber shape	Short oval, slightly flattened
Eyes	Medium to deep
Skin	White, textured
Flesh	White
Plant	Medium, spreading
Flowers	White

CHARACTERISTICS

Yield	Medium to high
Specific gravity	Medium
Maturity	Midseason
Storability	Short dormancy
Availability	ME, ND, NY

STRENGTHS AND WEAKNESSES

LaChipper is a midseason chip-stock variety. It has moderate to high yield, moderate specific gravity and white tubers. This variety is well suited for processing into potato chips. This variety has some resistance to late blight and is susceptible to air pollution damage and moderately susceptible to common scab.

NOR VALLEY

ORIGIN

Parentage	ND860-2 x Norchip
Breeder	North Dakota Agricultural Experiment Station
Released	1997
Status	Not Protected

DESCRIPTION

Tuber shape	Round to oblong
Eyes	Medium
Skin	White with yellow undertones
Flesh	Cream-white
Plant	Medium, erect upright, closed
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	Medium
Maturity	Midseason
Storability	Medium dormancy
Availability	ID, ME, MN, ND, OR, WA

STRENGTHS AND WEAKNESSES

This variety has a medium dormancy period, good storability and is good for processing into chips. The outstanding feature of NorValley is its ability to produce commercially acceptable chips directly out of 42.8°F (6°C) storage without the need for reconditioning. This variety is resistant to hollow heart, common scab and blackspot. It is susceptible to PVY, PVX, late blight, early blight, verticillium wilt, fusarium dry rot and bacterial soft rot.

NORWIS

ORIGIN

Parentage	ND 292-1 x TND22-2
Breeder	Frito-Lay, Inc.
Released	1977
Status	Not protected

DESCRIPTION

Tuber shape	Oval, slightly flattened
Eyes	Shallow, apical eyes moderately deep
Skin	White to tan
Flesh	Pale yellow
Plant	Medium to large
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	Medium
Maturity	Midseason
Storability	Short dormancy
Availability	ME, MI

STRENGTHS AND WEAKNESSES

Norwis is a medium to late season chip-stock and table-stock variety. Its yield and specific gravity are both high. Chip color is good at harvest and when stored at 50°F (10°C) or warmer. Norwis is not well-suited to long term cold storage for chip processing. The tubers are blocky, oval and relatively smooth. Norwis is resistant to PVX, PVY, leafroll and southern bacterial wilt. It is susceptible to verticillium wilt, pinkeye, external brown spot and common scab.

PIKE

ORIGIN

Parentage	Allegany x Atlantic
Breeder	Cornell University
Released	1996
Status	Not protected

DESCRIPTION

Tuber shape	Short oval, slightly flattened
Eyes	Shallow lateral, deep apical
Skin	Buff, slightly netted
Flesh	White
Plant	Large; upright
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	High
Maturity	Midseason
Storability	Medium dormancy
Availability	ID, ME, MI, NE, NY, WA, WI

STRENGTHS AND WEAKNESSES

The major strength of Pike is its good chip processing characteristics. Tubers of this variety can be stored at 45°F (7.2°C) and produce light color chips. Tuber yield and specific gravity of Pike are about equal to Atlantic. This chip-stock variety stores well at 46.4°F (8°C) for chips. Pike has excellent common scab resistance and is resistant to golden nematode and hollow heart. It is susceptible to net necrosis.

REBA

ORIGIN

Parentage	Monona x Allegany
Breeder	Cornell University
Released	1997
Status	Not protected

DESCRIPTION

Tuber shape	Short oval
Eyes	Shallow
Skin	White
Flesh	White
Plant	Medium to large, semi-erect
Flowers	White

CHARACTERISTICS

Yield	Medium to high
Specific gravity	Medium
Maturity	Mid to late season
Storability	Long dormancy
Availability	ME, MI, NY, WI

STRENGTHS AND WEAKNESSES

Reba is a mid to late season chip and table-stock variety. It has high yields with specific gravity averaging 1.074. This variety stores well with few problems and chips well from 45°F (7.2°C) storage. Tubers are large with white skin and white flesh. This variety is resistant to golden nematode, common scab, verticillium and early blight. It is susceptible to late blight.

SNOWDEN

ORIGIN

Parentage	B5141-6 x Wischip
Breeder	University of Wisconsin
Released	1990
Status	Not protected

DESCRIPTION

Tuber shape	Round, slightly flattened
Eyes	Medium
Skin	Tan
Flesh	White
Plant	Large, semi-erect
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	High
Maturity	Late
Storability	Short dormancy
Availability	CO, ME, MI, MN, NE, ND, NY, WA, WI

STRENGTHS AND WEAKNESSES

Snowden is a late maturing chip-stock variety with high specific gravity and above average yields. This variety has excellent chipping quality from the field and from storage. It will produce an acceptable chip color from storage temperatures above 45°F (7.2°C). This variety is resistant to scab and susceptible to bruising.

SUMMARY OF US CHIP-STOCK VARIETIES

	SPECIFIC GRAVITY	MATURITY	STORABILITY	TUBER SHAPE	SKIN COLOR	FLESH COLOR
ALTURAS	High	Late	Short	Oblong	Tan	White
ANDOVER	Medium	Early to Mid	Medium	Short Oval	White	White
ATLANTIC	High	Midseason	Medium	Short Oval	Buff	White
CHIPETA	High	Mid to Late	Medium	Short Oval	White to Tan	White
DAKOTA PEARL	Med to High	Midseason	Long	Round	White	White
IVORY CRISP	High	Midseason	Medium	Round	White	White
KENNEBEC	Med to High	Midseason	Medium	Short Oval	Buff	White
LACHIPPER	Medium	Midseason	Short	Short Oval	White	White
NORVALLEY	Medium	Midseason	Medium	Round to Oblong	White	Cream-white
NORWIS	Medium	Midseason	Short	Oval	White to Tan	Pale Yellow
PIKE	High	Midseason	Medium	Short Oval	Buff	White
REBA	Medium	Mid to Late	Long	Short Oval	White	White
SNOWDEN	High	Late	Short	Round	Tan	White

GROWING/HANDLING/STORAGE

United States' potato growers have optimal climate and soil, modern equipment and technologies to produce high quality chipping potatoes. Harvesting, proper handling, equipment and storage facilities are vital to maintaining high quality chipping potatoes throughout the process from the field to the manufacturing plant. Harvesting and handling equipment is managed to minimize tuber damage by operating at designed capacity based on identified optimal operating rates. To minimize tuber damage, soil is conditioned by light irrigation. Harvest for storage potatoes occurs when tuber temperatures are between 50^0 and 60^0F (10^0 and 15.5^0C) and the potatoes are mature. Freshly harvested potatoes are allowed to suberize for approximately two to four weeks at 58^0F (14.4^0C). During this period, excess sugars are pre-conditioned out of the tuber before the temperature is dropped ($1/2^0$ per day) to a holding temperature range between 48^0 - 52^0F (8.9^0 - 11.1^0C). Sprout inhibitor is applied early in storage to prevent breaking of tuber dormancy.

Potatoes are stored in specially designed potato storages where the temperature, relative humidity, oxygen and carbon dioxide can be monitored and controlled to specific conditions, depending on the chipping variety to maximize the storage life span of the potatoes. Potato storages in the United States are modern facilities using the latest technologies to minimize sugar content. A temperature of 48^0 - 52^0F (8.9^0 - 11.1^0C) is used to maintain a low concentration of free sugars during storage. Ventilation is controlled to permit approximately 18 to 21 cfm (cubic feet per minute) of air per ton of potatoes. This allows for sufficient oxygen to keep the potatoes from being stressed. When a potato is stressed, starch is broken down to sucrose (12-carbon sugar) and eventually to the reducing sugars glucose and fructose (6-carbon sugars). It is these reducing sugars that cause chip darkening when potato chips are fried. Relative humidity is maintained at 90 to 95% to reduce shrinkage, pressure bruising, and loss of tuber texture. Finally, the use of Controlled Atmospheric (CA) conditions in storage is considered vital for longer storage. Essentially, this method of holding potatoes allows the tubers to remain dormant with little or no respiration. The goal of CA storage is to maintain the oxygen at a lower level by controlling the rate of air flow and keeping the carbon dioxide (the end product of respiration) at no more than 1 percent.

A CMM (chemical maturity monitoring) technique to monitor and control sugar levels in potatoes during growth and storage is employed (Sowokinos and Preston, 1988). This technique utilizes the YSI, model 2700 Select, Industrial Sugar Analyzer. Both the concentrations of sucrose (desire 1 mg/g or less) and glucose (desire 0.35 mg/g or less) are monitored to ensure a stress-free storage environment. Chip color and sugars are monitored bimonthly to verify that the potatoes shipped are of the highest quality.

Shipping

Shipping fresh US potatoes internationally through US ports will be managed with high quality efficiency and competitive rates. The basic requirements for conditions during transportation are similar to those needed for storage, including proper control of temperature, humidity and ventilation. Using proper shipping containers to control these conditions reduces the risks associated with exporting US potatoes.

During transportation and receiving, the temperature, ventilation, humidity, and receiving guidelines listed below should be followed in order to maintain a quality product.

Temperature: It is important that chipping potatoes not be stressed by heat or cold during transit. Storage and transit climates must be cool enough to prevent sprouting, but not so cold that sugars build in the tuber. Temperatures should be held between 45^0 - 52^0F (8.9^0 - 11.1^0C).

Humidity: The relative humidity must be kept as high as possible to prevent shrinkage and pressure bruising. Relative humidity of the ventilating air should be at least 95%. Humidity levels below this will increase weight loss and decrease quality.

Ventilation: Sufficient air and oxygen must be moved through the potatoes. If only inside air is circulated through the hold, CO_2 and moisture will increase, causing a rapid darkening of chip color. Airflow should be maintained during transportation. If possible, vented doors should allow for the entry of outside air. Full ventilation is recommended to maximize quality shipping conditions.

Receiving: When the container arrives check the inside temperature to determine if it was too hot or cold during shipping. Tuber temperature in containers should be elevated to 55^0 - 60^0F (12.8^0 to 15.5^0C) before unloading to reduce bruising.

Transit Time: Five of the six major West Coast ports are in the "top ten" of US ports in terms of total dollar value in foreign waterborne trade. They have invested hundreds of millions of dollars constructing world-class marine terminals with state-of-the-art infrastructure and equipment for the handling, warehousing, and staging needed to safely process global cargoes. More importantly, because of geographic proximity, all of the West Coast ports have successful track records in expediting the shipment of agricultural commodities to Asia. The following table gives a sample of transit times from six West Coast ports to selected Asian countries.

Transit time from West Coast US ports to selected Asian ports

	Bangkok, Thailand	Busan, S. Korea	Jakarta, Indonesia	Kaohsiung, Taiwan	Keelung, Taiwan	Laem Chabang, Thailand	Manila, Philippines	Osaka, Japan	Singapore	Tokyo, Japan	Yokohoma, Japan
Seattle, Washington	24	19	25	14	14	24	18	11	25	10	10
Tacoma, Washington	23	16	24	13	13	23	17	10	20	9	9
Portland, Oregon	24	19	25	14	14	24	18	11	21	10	10
Oakland, California	21	16	22	11	12	28	26	12	24	11	11
Long Beach, California	33	19	33	19	19	34	23	16	30	12	12
Los Angeles, California	34	18	32	18	18	33	22	15	25	11	11

*Data from Maersk shipping line schedules

Growing Under Contract

There are four harvest seasons in the United States; winter, spring, summer and fall. Ninety percent of US potato production is harvested in the fall. Fall-season potatoes are planted in the spring, with most of the crop harvested in September through November. Potatoes that are not marketed immediately following harvest are sold from storage throughout the remainder of the marketing season. Potatoes harvested in the winter, spring and summer account for about 10% of the total US production, however there is a large percentage of chipping potatoes at these times. Potatoes harvested in these seasons help ensure adequate supplies of potatoes with consistent chipping characteristics and product quality.

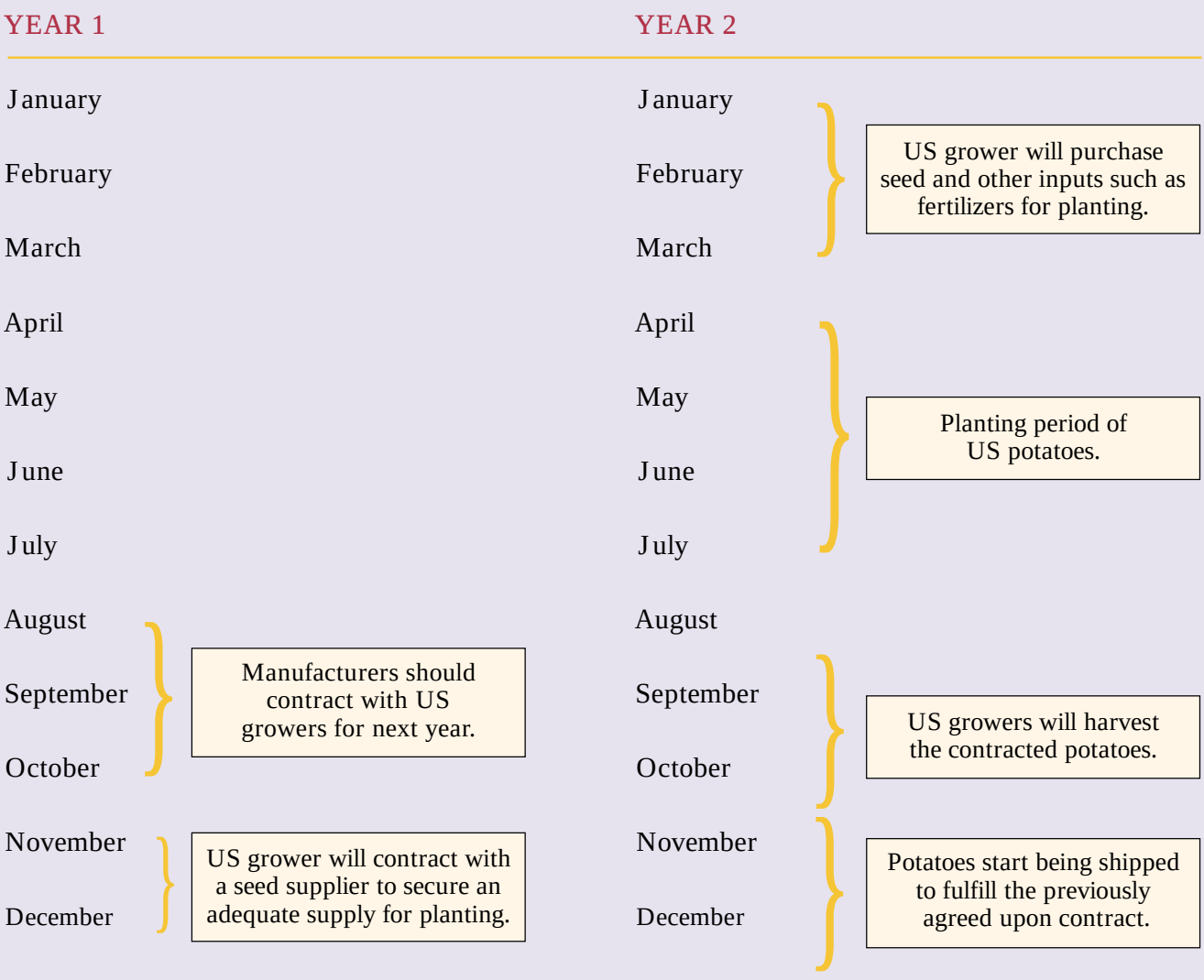
Potatoes for chip processing in the United States are typically grown under contract with processors. This allows buyer and seller to agree in advance on key elements important to both, such as the variety to be grown, volume and price. While some non-contracted processing potatoes are available, a stable and suitable supply can only be assured through contracting with a grower. Open market prices and variety availability change and are subject to the time of year and market conditions.

US Potato Harvest Seasons

The later into the season, the higher the prices tend to be as growers take into consideration the storage costs involved with keeping the potatoes in quality condition. Therefore, in order to assure an available supply of chipping potatoes for import/export, contracts must be developed between growers and foreign processors prior to planting.

It is best to negotiate and sign contracts prior to planting. For example potatoes purchased from the fall harvest season for 2006 should be discussed in fall 2005. Early contracting allows the grower to initiate a contract with a seed supplier in the winter (November/December) to secure an adequate supply for planting the required acreage in the spring. Growers will then harvest the potatoes in the fall (September/ October) of the contracted year and will be ready for shipping in October/November to fulfill the contract.

Growing Under Contract: An Example



Note: This example is for fall harvested potatoes. The same lead time is required for winter, spring and summer harvests.

References

Gould, Wilbur. 1995. What to Consider When Buying Chipping Potatoes. Snack Food Association Chipping Potato Handbook, 35.

Sowokinos, J.R. and D.A. Preston. 1988. Maintenance of potato processing quality by chemical maturity monitoring. Minnesota Agr. Exp. Sta. Bulletin 586-1988 (Item #AD-SB-344), 11 pages.

Thornton, R.E., D.A. Smittle and C.L. Peterson. 1981. Reducing Potato Damage During Harvest. Washington State University Extension Bulletin 646.

United States Department of Agriculture, Economic Research Service. 2004. Potatoes Background Briefing Room. www.ers.usda.gov.

This is the 5” vertical pocket that glues into the inside back cover.

Glossary

Agtron: An instrument that objectively measures relative color characteristics.

Agtron Values: Chip color values measured by Agtron instruments.

Apical: Used to describe the top or apex of something.

Blackspot: Dark semispherical spot in the flesh beneath the hard tuber surface.

CFM (Cubic Feet per Minute): The volume of the air that is compressed each minute.

Culinary: Relating to food or cooking.

CWT (Hundred Weight): A unit of mass used in the United States equal to 100 pounds.

Dry Matter: Solid content of a tuber. Made up of carbohydrates, protein and mineral or ash.

Foliar: Relating to, producing, or being the leaves of a plant.

Hollow Heart: Associated with excessively rapid tuber enlargement. Incidence is associated with large tubers.

Oblong: Having a shape that is considerably longer than it is wide.

Pressure Bruising: A type of bruise that occurs in storage where tubers develop softened, flattened or indented areas as a result of continuous pressure. They may discolor the flesh of the tuber which shows up after processing as gray areas.

Relative Humidity: The ratio of the amount of water vapor actually present in the air to the greatest amount possible at the same temperature.

Russetted Tubers: Tubers with brown rough skin.

Shatter Bruise: Cracks or splits on the tuber surface that penetrate the flesh.

Sloughing: Discarding or shedding something.

Specific Gravity: A measure of total solids content of a product.

Suberize: To deposit a fatty substance in plant cell walls during their conversion to cork tissue. Wound healing and thickening of the skin.

Sweetening: A process of starch breaking down to sucrose and in turn to glucose and fructose after a given resting period.

YSI (Yellow Springs Instrument): Instrument used to evaluate the sugars in potatoes by measuring the glucose and sucrose in tubers.

US Potato Board
7555 E. Hampden Ave.
Suite 412
Denver, CO 80231
Tel: 303.369.7783
Fax: 303.369.7718
uspb@uspotatoes.com
www.potatoesusa.com

State Potato Organizations

ALASKA

Alaska Seed Growers, Inc.
Alaska Plant Materials Center
HC04 Box 7440
Palmer, AK 99645
Phone: 907-745-4469
Fax: 907-745-1568
E-mail: Bill_Campbell@dnr.state.ak.us
Contact: Mr. William Campbell

CALIFORNIA

Tulelake Growers Association
P.O. Box 338
356 Main Street
Tulelake, CA 96134
Phone: 530-667-5214
Fax: 530-667-3919
E-mail: tgatopromoteag@cot.net
Contact: Ms. Deb Crisp

Western Growers Association
P.O. Box 2130
Newport Beach, CA 92658-8944
Phone: 949-863-1000
Fax: 949-809-6267
E-mail: kgilliland@wga.com
Website: www.wga.com
Contact: Mr. Ken Gilliland

COLORADO

Colorado Potato Administrative Committee-Area II
P.O. Box 348
Monte Vista, CO 81144
Phone: 719-852-3322
Fax: 719-852-4684
E-mail: cvcpac@fone.net
Website: www.coloradopotato.org
Contact: Mr. Chris Voigt

Colorado Potato Administrative Committee-Area III
610 Cheyenne Ave.
Eaton, CO 80615
Phone: 970-454-1772
E-mail: cpaciii@msn.com
Contact: Ms. Lola Mundt

DELAWARE

Delaware Potato Board
Delaware Department of Agriculture
2320 South Dupont Highway
Dover, DE 19901
Phone: 302-698-4523
Fax: 302-697-2345
E-mail: Amanda.brown@state.de.us
Contact: Ms. Amanda Brown

FLORIDA

North Florida Growers Exchange
P.O. Box 655
Hastings, FL 32145
Phone: 904-692-1941
Fax: 904-692-3657
Contact: Mr. Bill Cotton

South Florida Potato Growers Exchange
P.O. Box 901670
Homestead, FL 33090
Phone: 305-245-7783
Fax: 305-246-8900
E-mail: fl_spuds@bellsouth.net
Contact: Mr. Mike Hevener

IDAHO

Idaho-Eastern Oregon Potato Committee
P.O. Box 2192
Idaho Falls, ID 83403
Phone: 208-529-8057
Fax: 208-529-8057
Contact: Mr. Robert Hansen

Idaho Grower Shippers Association
P.O. Box 51100
Idaho Falls, ID 83405
Phone: 208-529-4400
Fax: 208-529-4403
E-mail: dsmith@idahoshippers.com
Website: www.idahoshippers.com
Contact: Mr. David Smith

Idaho Potato Commission
P.O. Box 1068
Boise, ID 83701
Phone: 208-334-2350
Fax: 208-334-2274
E-mail: ipc@potato.state.id.us
Website: www.idahopotato.com
Contact: Mr. Frank Muir

Potato Growers of Idaho, Inc.
P.O. Box 949
1010 West Bridge
Blackfoot, ID 83221
Phone: 208-785-1110
Fax: 208-785-1249
E-mail: pgike@cableone.net
Website:
www.potatogrowersofidaho.com
Contact: Mr. Keith Esplin

MAINE

Maine Potato Board
744 Main Street, Room 1
Presque Isle, ME 04769
Phone: 207-769-5061
Fax: 207-764-4148
E-mail: flannery@mainepotatoes.com
Website: www.mainepotatoes.com
Contact: Mr. Don Flannery

MICHIGAN

Michigan Potato Industry Commission
13109 Schavey Road, Suite 7
DeWitt, MI 48820
Phone: 517-669-8377
Fax: 517-669-1121
E-mail: mipotato@aol.com
Website: www.mipotato.com
Contact: Mr. Ben Kudwa

MINNESOTA

Minnesota Area II Potato Growers Research & Promotion Council
9029 80th Avenue
Clear Lake, MN 55319
Phone: 320-743-2837
Fax: 320-743-2062
E-mail: info@minnesotapotato.org
Website: www.minnesotapotato.org
Contact: Mr. Paul Gray

Northern Plains Growers Association
P.O. Box 301
420 Business Highway 2 E
East Grand Forks, MN 56721
Phone: 218-773-3633
Fax: 218-773-6227
E-mail: dmaatz@nppga.org
Website: www.nppga.org
Contact: Mr. Duane Maatz

State Potato Organizations (continued)

MONTANA

Montana Potato Advisory Committee
P.O. Box 1287
Townsend, MT 59644
Phone: 406-266-5610
Fax: 406-266-4340
E-mail: nwps@ixi.net
Contact: Mr. Steve McCullough

NEBRASKA

Nebraska Potato Council
P.O. Box 755
Alliance, NE 69301
Phone: 308-762-4917
Fax: 308-762-7656
E-mail: westpoinc@bbc.net
Contact: Mr. Gene Kerschner

NEW YORK

Empire State Potato Club, Inc.
P.O. Box 566
Stanley, NY 14561
Phone: 877-697-7837
Fax: 585-526-6576
E-mail: espgefd@aol.com
Website:
www.empirepotatogrowers.com
Contact: Ms. Melanie Wickham

NORTH CAROLINA

North Carolina Potato Association
P.O. Box 2066
Elizabeth City, NC 27909
Phone: 252-331-4773
Fax: 252-331-4775
E-mail: tommy.fleetwood@ncmail.net
Website: www.ncpotatoes.org
Contact: Mr. Tommy Fleetwood

OHIO

Ohio Potato Growers Association
4680 Indianola Avenue
Columbus, OH 43214
Phone: 614-261-6834
Fax: 614-261-6835
E-mail: ohiopotato@aol.com
Contact: Mr. David Kelly

OREGON

See Idaho—Eastern Oregon Potato Committee

Oregon Potato Commission
700 N.E. Multnomah, Suite 460
Portland, OR 97232-4104
Phone: 503-731-3300
Fax: 503-239-4763
E-mail: info@oregonspuds.com
Website: www.oregonspuds.com
Contact: Mr. William Wise

PENNSYLVANIA

Pennsylvania Cooperative Potato Growers, Inc.
3107 North Front Street
Suite 100
Harrisburg, PA 17110-1328
Phone: 717-232-5300
Fax: 717-232-1885
E-mail: papotato@comcast.com
Contact: Mr. Roger Springer

VIRGINIA

Association of Virginia Potato and Vegetable Growers, Inc.
P.O. Box 26
Onley, VA 23418
Phone: 757-787-5867
Fax: 757-787-5973
E-mail: onleyva@shore.intercom.net
Contact: Mr. Steve Sturgis

WASHINGTON

Potato Growers of Washington
P.O. Box 563
Othello, WA 99344
Phone: 509-488-6688
Fax: 509-488-7654
E-mail: dale@pgw.net
Contact: Mr. Dale Lathim

Washington State Potato Commission
108 Interlake Road
Moses Lake, WA 98837
Phone: 509-765-8845
Fax: 509-765-4853
E-mail: wspc@potatoes.com
Website: www.potatoes.com
Contact: Mr. Pat Boss

WISCONSIN

Wisconsin Potato and Vegetable Growers Association, Inc.
P.O. Box 327
Antigo, WI 54409
Phone: 715-623-7683
Fax: 715-623-3176
E-mail:
mcarter@wisconsinpotatoes.com
Website: www.wisconsinpotatoes.com
Contact: Mr. Mike Carter

US Potato Associations

National Potato Council
1300 L Street, NW Suite 910
Washington, DC 20005
Tel: 202-682-9456
Fax: 202-682-0333
www.nationalpotatocouncil.org

Potato Association of America
University of Maine
5715 Coburn Hall, Room 6
Orono, ME 04469
Tel: 207-581-3042
Fax: 207-581-3015
www.ume.maine.edu/PAA

Snack Food Association
1711 King Street, Suite 1
Alexandria, VA 22314
Tel: 800-628-1334
Fax: 703-836-8262
www.sfa.org

US Potato Board
7555 E. Hampden Ave.
#412
Denver, CO 80231
Tel: 303-369-7783
Fax: 303-369-7718
www.potatoesusa.com

Chip Potato Growers

Aroostook Produce Distributors, Inc.
P.O. Box 649
Houlton, ME 04730
Tel: 207-532-3103
Fax: 207-532-3103
Contact: Mr. Gerald Miller
E-mail: apd@mfx.net

Ayers and Gillette LLC
P.O. Box 84
88 West Main
Pike, NY 14130
Tel: 585-493-2394
Fax: 585-493-9385
Contact: Mr. Thom Ayers

Bliss Produce Co., Inc.
P.O. Box 816
Greeley, CO 80632
Tel: 970-353-1864
Fax: 970-351-7007
Contact: Mr. Robert D. Bliss
2nd Contact: Mr. Michael D. Bliss

Bula-Gieringer Farms
349 Highway M
Coloma, WI 54930
Tel: 608-339-9869
Fax: 608-339-2617
Contact: Mr. Mark Bula
E-mail: bula@mops.net

California-Oregon Seed, Inc.
585 Hi-Tech Parkway
Oakdale, CA 95361
Tel: 209-847-4660
Fax: 209-952-7773
Contact: Mr. Rob Campbell
E-mail: caloreseed@aol.com

County Line Potato Farm
247 118th Avenue
Shelbyville, MI 49344
Tel: 269-672-9436
Fax: 269-672-9272
Contact: Mr. Wayne Leep
E-mail: wdleep@mei.net

County Super Spud, Inc.
P.O. Box 660
Mars Hill, ME 04758
Tel: 207-429-9449
Fax: 207-425-7808
Contact: Mr. Jay McCrum
E-mail: superspud@mfx.net

Down River Farms
1355 South 343
Shiloh, NC 27974
Tel: 252-336-2612
Fax: 252-336-4636
Contact: Mr. Abner Staples

Erickson Farms Inc.
15612 Best Road
Mount Vernon, WA 98273
Tel: 360-466-3772
Fax: 360-466-2803
Contact: Mr. Mark Erickson
2nd Contact: Mr. Steve Erickson

Faldet Farms, Inc.
N 7649 Highway 49
Iola, WI 54945
Tel: 715-445-2453
Fax: 715-445-2351
Contact: Mr. Brad Faldet
E-mail: faldetfarms@gglbbs.com

Farmers Potato Exchange, Inc.
P.O. Box 53
Antigo, WI 54409
Tel: 715-623-3746
Fax: 715-623-3748
Contact: Mr. Dave Cofer

Flewelling Family Farms
P.O. Box 95
Easton, ME 04740
Tel: 207-488-3171
Fax: 207-488-3171
Contact: Mr. Gaylen Flewelling
E-mail: flewfamily@mfx.net

Gary Bula Farms, Inc.
P.O. Box 9
Grand Marsh, WI 53936
Tel: 608-339-2083
Fax: 608-339-9211
Contact: Mr. Gary Bula
2nd Contact: Ms. Lynda Bula

Glenn Pendleton Farms
785 Dry Ridge Road
Elizabeth City, NC 27909
Tel: 252-330-4294
Fax: 252-330-4878
Contact: Mr. Glenn Pendleton

Gruesbeck Produce Farms, Inc.
6924 Peck Road
Eaton Rapids, MI 48827
Tel: 517-230-1310
Fax: 517-663-1739
Contact: Mr. Robert Gruesbeck
E-mail: bgruesbeck@att.net

Harris Farms
P.O. Box 149
Roper, NC 27970
Tel: 252-793-9907
Fax: 252-793-5447
Contact: Mr. Michael Harris
2nd Contact: Ms. Elizabeth Harris Foster

Heartland Farms Inc.
907 Third Avenue
Hancock, WI 54943
Tel: 715-249-5555
Fax: 715-249-3011
Contact: Mr. Richard Pavelski
2nd Contact: Mr. Tim Stevenson
E-mail: richard.pavelski@heartland-farms-wis.com

Helbach Farms, LLC
9288 Highway 54
Amherst, WI 54406
Tel: 715-824-3236
Fax: 715-824-5397
Contact: Mr. Bob Helbach
2nd Contact: Mr. Michael Helbach

Hyland Lakes Spuds, Inc.
N4491 Highway BB
Antigo, WI 54409
Tel: 715-623-6293
Fax: 715-623-4246
Contact: Mr. John F. Wolter
E-mail: hlspuds@newnorth.net

Joseph L Meyer and Sons, Inc.
9260 Rt. 21
Cohocton, NY 14826
Tel: 585-384-5928
Fax: 585-384-5988
Contact: Mr. John Meyer
E-mail: jmeyer8008@aol.com

Chip Potato Growers (continued)

J.W. Mattek & Sons, Inc.
N 5798 Star Neva Road
Deerbrook, WI 54424
Tel: 715-623-6963
Fax: 715-627-7245
Contact: Mr. Jim Mattek
E-mail: jwmattek@newnorth.net

Knutzen Farms
9255 Chuckanut Drive
Burlington, WA 98233
Tel: 360-757-6771
Fax: 360-757-3222
Contact: Mr. Kraig Knutzen
2nd Contact: Mr. Roger Knutzen
E-mail: kraig@knutzenfarms.com
2nd E-mail: sales@knutzenfarms.com

Lennard Ag Company
1202 Samaria Road
Samaria, MI 48177
Tel: 734-856-1650
Fax: 734-856-1660
Contact: Mr. Kyle Lennard
E-mail: lennardfarms@toast.net

L. Walther & Sons Inc.
33 90 W. Lake Road
Clio, MI 48420
Tel: 810-687-1194
Fax: 810-687-7010
Contact: Mr. Richard Rehfeld
E-mail: rrehfeld@waltherfarms.com

Melvin W. Bright Produce, Inc.
1426 Salem Church Road
Elizabeth City, NC 27909
Tel: 252-330-2681
Fax: 252-330-2172
Contact: Mr. Melvin W. Bright
E-mail:
mwbrightproduce@inteliport.com

McCormick Farms, Inc.
4189 Rt. 78
Bliss, NY 14024
Tel: 585-322-7274
Fax: 585-322-7495
Contact: Mr. Jim McCormick
E-mail: mfi@wycol.com

My-T Acres, Inc.
8127 Lewiston Road
Batavia, NY 14020
Tel: 585-343-1026
Fax: 585-343-2051
Contact: Mr. Nate Call

R & G Potato Co.
2662 Lakeview Road
American Falls, ID 83211
Tel: 208-226-2069
Fax: 208-226-2692
Contact: Mr. Garn Theobald
E-mail: garn@rgpotato.com

S.F. McCotter & Sons
P.O. Box 187
Vandemere, NC 28587
Tel: 252-745-5152
Fax: 252-745-3885
Contact: Mr. Pat McCotter
E-mail: seaspud@pamlico.net

Sowinski Farms, Inc.
5818 Fire Lane
Rhinelander, WI 54501
Tel: 715-272-1192
Fax: 715-272-1658
Contact: Mr. Alvin Sowinski
E-mail: sowinski@newnorth.net
2nd E-mail: sfi@newnorth.net

Thaemert Farms, LLC
5117 Road Q SW
Quincy, WA 98848
Tel: 509-785-3722
Fax: 509-785-3722
Contact: Mr. Kevin Thaemert
E-mail: thaemertfarms@starband.net

Threemile Canyon Farms, LLC
75906 Threemile Road
Boardman, OR 97818
Tel: 541-481-9274
Fax: 541-481-9278
Contact: Mr. Marty Myers
E-mail: marty@threemilecanyon-
farms.com

Votypka Farms
P.O. Box 356
Wayland, NY 14572-0356
Tel: 585-728-2386
Fax: 585-728-2386
Contact: Mr. David Votypka
2nd Contact: Ms. Lisa Votypka
E-mail: votypka@aol.com

4-L Farms, Inc.
1961 4th Street
Shelbyville, MI 49344
Tel: 269-672-5745
Fax: 269-672-9449
Contact: Mr. Glenn Leep
E-mail: glennleep@allegan.net

ALTURAS

ORIGIN

Parentage	A77182-1 x A75188-3
Breeder	University of Idaho
Released	1982
Status	Protected

DESCRIPTION

Tuber shape	Oblong to long
Eyes	Medium, predominantly apical
Skin	Tan
Flesh	White
Plant	Medium, semi-erect
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	High
Maturity	Late
Storability	Short dormancy
Availability	CO, ID, MT, OR, WA, WI

ANDOVER

ORIGIN

Parentage	Allegany x Atlantic
Breeder	Cornell University
Released	1995
Status	Not Protected

DESCRIPTION

Tuber shape	Short oval
Eyes	Shallow
Skin	White, textured
Flesh	White
Plant	Erect, medium
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	Medium
Maturity	Early to midseason
Storability	Medium dormancy
Availability	ME, NY, WI

ATLANTIC

ORIGIN

Parentage	Wauseon x B5141-6
Breeder	USDA Beltsville
Released	1978
Status	Not protected

DESCRIPTION

Tuber shape	Short oval
Eyes	Shallow
Skin	Light to heavy scaly net, buff
Flesh	White
Plant	Medium large size, upright
Flowers	Purple

CHARACTERISTICS

Yield	High
Specific gravity	High
Maturity	Midseason
Storability	Medium dormancy
Availability	CA, CO, ID, ME, MI, MN, ND, NE, NY, OR, WA, WI

CHIPETA

ORIGIN

Parentage	WNC612-13 x Wischip
Breeder	Colorado State University
Released	1993
Status	Not protected

DESCRIPTION

Tuber shape	Short oval
Eyes	Shallow, even distribution
Skin	White to light tan
Flesh	White
Plant	Large, erect
Flowers	Red-purple

CHARACTERISTICS

Yield	High
Specific gravity	High
Maturity	Mid to late season
Storability	Medium dormancy
Availability	CA, CO, ID

US Chip-stock Varieties

DAKOTA PEARL

ORIGIN

Parentage	ND1118 x ND944-6
Breeder	North Dakota State University
Released	1999
Status	PVP application pending, North Dakota State University

DESCRIPTION

Tuber shape	Round
Eyes	Shallow
Skin	White
Flesh	White
Plant	Large, semi-erect
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	Medium to high
Maturity	Midseason
Storability	Long dormancy
Availability	ME, MN, NE, ND, OR, WA, WI

IVORY CRISP

ORIGIN

Parentage	ND292-1 x TND22-2
Breeder	Agricultural Experiement Stations of ID, OR, WA, ND and USDA
Released	2001
Status	Protected

DESCRIPTION

Tuber shape	Round
Eyes	Medium, predominantly apical
Skin	White
Flesh	White
Plant	Closed-medium, spreading vine
Flowers	White

CHARACTERISTICS

Yield	Medium
Specific gravity	High
Maturity	Midseason
Storability	Medium dormancy
Availability	ID, ND, WI

KENNEBEC

ORIGIN

Parentage	B127 x USDA 95-56
Breeder	USDA
Released	1948
Status	Not protected

DESCRIPTION

Tuber shape	Short oval
Eyes	Shallow
Skin	Smooth, buff
Flesh	White
Plant	Large
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	Medium to high
Maturity	Midseason
Storability	Medium dormancy
Availability	AK, ME, MN, MT, NY, WA, WI

LA CHIPPER

ORIGIN

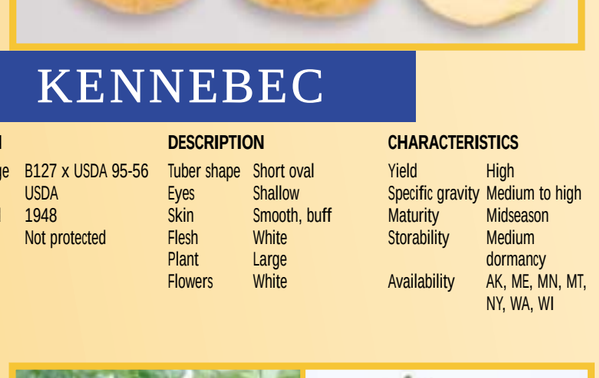
Parentage	Green Mountain x Cayuga
Breeder	Louisiana Agricultural Experimental Station
Released	1962
Status	Not protected

DESCRIPTION

Tuber shape	Short oval, slightly flattened
Eyes	Medium to deep
Skin	White, textured
Flesh	White
Plant	Medium, spreading
Flowers	White

CHARACTERISTICS

Yield	Medium to high
Specific gravity	Medium
Maturity	Midseason
Storability	Short dormancy
Availability	ME, ND, NY



NOR VALLEY

ORIGIN

Parentage	ND860-2 x Norchip
Breeder	North Dakota Agricultural Experiment Station
Released	1997
Status	Not Protected

DESCRIPTION

Tuber shape	Round to oblong
Eyes	Medium
Skin	White with yellow undertones
Flesh	Cream-white
Plant	Medium, erect upright,closed
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	Medium
Maturity	Midseason
Storability	Medium dormancy
Availability	ID, ME, MN, ND, OR

NORWIS

ORIGIN

Parentage	ND 292-1 x TND22-2
Breeder	Frito-Lay, Inc.
Released	1977
Status	Not protected

DESCRIPTION

Tuber shape	Oval, slightly flattened
Eyes	Shallow, apical eyes moderately deep
Skin	White to tan
Flesh	Pale yellow
Plant	Medium to large
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	Medium
Maturity	Midseason
Storability	Short dormancy
Availability	ME, MI

PIKE

ORIGIN

Parentage	Allegany x Atlantic
Breeder	Cornell University
Released	1996
Status	Not protected

DESCRIPTION

Tuber shape	Short oval, slightly flattened
Eyes	Shallow lateral, deep apical
Skin	Buff, slightly netted
Flesh	White
Plant	Large; upright
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	High
Maturity	Midseason
Storability	Medium dormancy
Availability	ID, ME, MI, NE, NY, WA, WI

REBA

ORIGIN

Parentage	Monona x Allegany
Breeder	Cornell University
Released	1997
Status	Not protected

DESCRIPTION

Tuber shape	Short oval
Eyes	Shallow
Skin	White
Flesh	White
Plant	Medium to large, semi-erect
Flowers	White

CHARACTERISTICS

Yield	Medium to high
Specific gravity	Medium
Maturity	Mid to late season
Storability	Long dormancy
Availability	ME, MI, NY, WI

SNOWDEN

ORIGIN

Parentage	B5141-6 x Wischip
Breeder	University of Wisconsin
Released	1990
Status	Not protected

DESCRIPTION

Tuber shape	Round, slightly flattened
Eyes	Medium
Skin	Tan
Flesh	White
Plant	Large, semi-erect
Flowers	White

CHARACTERISTICS

Yield	High
Specific gravity	High
Maturity	Late
Storability	Short dormancy
Availability	CO, ME, MI, MN, NE, ND, NY, WA, WI

UNITED STATES Potato BOARD

7555 E. Hampden Ave.
Suite 412
Denver, CO 80231
Tel: 303.369.7783
Fax: 303.369.7718
www.potatoesusa.com
uspb@uspotatoes.com